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Is Hausa a Suprasegmental Language?*

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1. Introduction

It has been proposed in Leben (1973a, b) that certain phenomena in Hausa require rules which depend on having tone in some morphemes represented suprasegmentally; that is, these morphemes must have separate phonological matrices for tone and for 'segmental' features (which would in Hausa be all other phonological features, presumably). This paper will present a reanalysis of these phenomena (section 2) which is based on an independently motivated type of tone assignment rule discussed in section 3. In the final section, I will discuss some implications of this reanalysis for theories of tone in general, and for Leben's theory (and John Goldsmith's similar theory--see Goldsmith (1975a, b)) of non-segmental representation in particular.

2. The Reanalysis

2.1. Leben's argument for suprasegmentally stated rules[1] in Hausa is based on the need to relate the tone pattern of the feminine form to that of the masculine form in agentive constructions and certain other forms, as illustrated in (1) (the examples are from Leben (1973a:133)).[2]

(1)	a.	jínjìr+ìi (m.)	jínjír+nìi+àa (f.) 'baby'
	b.	má+bì+ìi (m.)	má+bí+ìi+àa (f.) 'follower'
	c.	má+àikàt+ìi (m.)	má+áikát+ìi+àa (f.) 'worker'

Notice that in (1a) and (1b) the tone of the second syllable in the feminine is H, while in the masculine it is L. Moreover, in (1c) the tones of both the second and third syllables in the feminine are H while the corresponding syllables in the masculine are L. The appropriate generalization involved, Leben claims, is that the tones after the first syllable and before the -(n)ii suffix in the second morpheme are H in the feminine forms and L in the masculine forms in all three cases. He then proposes a rule of tone spreading (Leben (1973a:133)), given in (2), to derive the tone pattern on the feminine forms from that on the masculine forms.

(2) L → H/H __ L + (where '+' is a morpheme boundary)

This rule must apply to tones which are represented suprasegmentally on morphemes, since otherwise incorrect results would be derived from (1c), as shown in the derivations in (3).

(3)	Segmental Tone	Suprasegmental Tone	
	má+àikàt+ìi+àa	^{H}ma+^{L}aikat+^{L}ii+^{L}aa	Remote Form
	*má+áikàt+ìi+àa	^{H}ma+^{H}aikat+^{L}ii+^{L}aa	Rule (2)
	---	má+áikát+ìi+àa	Tone Mapping

Leben further points out that even a theory which allows rules to apply iteratively to their own output would give incorrect results since, although allowing rule (2) to apply again to the starred form in (3) would give the correct results (cf. (1c)), we would get wrong results for the masculine form since the environment for (2) would be met if tone is represented segmentally, as indicated in the derivation given in (4).

(4)	má+àikàt+ìi	Remote Form
	*má+áikàt+ìi	Rule (2)

Thus there seems to be a fairly strong case for suprasegmental representation of tone in such forms.

2.2. However, the assumption that the tone pattern for the feminine is derived from that for the masculine seems to me to be questionable. In fact, as I will show in the next section, there are a large number of morphologically related forms in Hausa whose tone patterns cannot be derivationally related if tone is represented either segmentally or suprasegmentally. This suggests that the same sort of thing might be going on here. Along these lines, I propose a rule of tone assignment given informally in (5).[3]

(5) (i) The tone pattern of the masculine form in the agentive construction is $H(L)_1$.

(ii) The tone pattern of the feminine in such construction is $(H)_1LL$.

(iii) The tone pattern of feminine forms which are derived by adding -aa to the corresponding masculine form, and whose 'extension' (i.e., the suffix which precedes the feminine -aa suffix) ends in a front vowel, is BLL, where 'B' for 'basic' is the tone pattern of the stem.

This rule must apply, of course, after the morphological rules which form such constructions. (5i) says essentially that ma-, the agentive prefix has a H tone and all other syllables are L, while (5ii) says that the last two syllables are L and everything else is H. (5iii) is essentially the generalization that all forms ending in surface -iyaa also end in the surface tone pattern BLH (where the final H is the result of Leben's low-tone raising rule). Other feminine forms would either be derived by Leben's (1971) non-suprasegmental rules or would be exceptions (cf. fn. 3).

2.3. One drawback to this proposal is the fact that most of Leben's rules are required here anyway; the only thing it buys

you, it seems, is getting away from the need for suprasegmental tone rules. There are other advantages, however. For example, as Leben (1973a) points out, the tone of the stem is irrelevant to the tone of the agentive construction--even though the verb bii (= 'follow') has an underlying H tone, it has a L tone in the masculine agentive form, and there must presumably be some sort of morphologically conditioned tone rule to get this L there. The same sort of problem will be apparent with all non-L stems in agentive constructions. Thus, it seems that any analysis of this construction will require at least one morphologically conditioned tone rule. That is, this proposal is only extending an already required analysis when it claims that all of the tones in such constructions are morphologically assigned.

Another advantage of this proposal is that it is no longer required to posit underlying rising tones (or a suprasegmental contour that results in a rising tone), which don't occur on the surface and are otherwise not needed,[4] in order to account for the data (taken from Leben 1971) presented in (6).

(6) béebée (m.) béebìyáa (f.) 'deaf mute'
àbóokíi (m.) àbóokìyáa (f.) 'friend'

The tone on the masculine form must be lexically specified (cf. sheégèe = 'bastard'), but the feminine form does not depend on anything other than the stem (the final vowels are not part of the stem), as expressed in (5iii).

Probably the strongest argument against Leben's tone-spreading rule (and therefore in favor of my reanalysis, in the absence of any other alternatives) is its peculiar form. Note that the morpheme boundary in the structural description is not really associated in any way with the affected 'segment' (i.e., the first L). While Kiparsky (1973) has given a plausible explanation for why a morpheme boundary might be needed between the affected segment and the one that causes the change (i.e., if a rule applied morpheme internally, it would result in restructuring), I know of no reason why a morpheme boundary should be needed one 'segment' after the affected 'segment' and two 'segments' after the one that causes the change. Furthermore, I know of no other phonological rule which requires a morpheme boundary in such a position. The uniqueness and 'unreasonableness' of rule (2), then, would seem to be fairly strong reasons for rejecting it.

A final point against Leben's analysis is the fact that, as he points out in a footnote in his thesis, there must be no morpheme boundaries in word-final position, since otherwise rule (2) would apply to (1c), (underlying $\underline{H_{ma}+L_{aikat}+L_{ii}}$ for Leben), thus producing the eventually ungrammatical $\underline{*H_{ma}+H_{aikat}+L_{ii}}$ (surface form presumably *má'áikácìi). This is contrary to the generally accepted convention for word boundaries (which are assigned to both sides of a word), and, as Leben notes, not accepted by many generative phonologists. Note that this 'convention' together with the discussion in the above paragraph, makes rule (2) look even more strange; it can apply only if there is a morpheme following the HLL sequence in question.

It seems questionable to me whether such a rule should be permitted in linguistic theory.[5]

In his thesis Leben (1973b) also claims that 'place of origin' constructions require the suprasegmental tone rule (2) to relate the feminine tone pattern to that of the masculine. He gives the pair in (7a) to support this claim (the others are from Abraham 1962).

(7) a. bà+kàtáagùm+ìi (m.) bà+kàtáagúm+ìi+àa (f.)
(cf. kàtáagùm)

b. bà+kátsín+èe (m.) bà+kátsín+ìi+àa (f.)
(cf. kàtsínà)

c. bà+gwáar+{íi / èe} (m.) bà+gwáar+ìi+àa (f.)
(cf. gwáaríi)

d. bà+núf+ée (m.) bà+núf+ìi+àa (f.)
(cf. núfée)

e. bà+dàur+íi (m.) bà+dàur+áa (f.)
(cf. dàuríi)

However, this construction seems to be amenable to the same type of treatment as the previous forms. Notice that all the feminine forms in (7) end in the tonal sequence HLL (which will come out HLH on the surface, due to Leben's 'low-tone raising', as noted above). Note further that the tone pattern for this construction seems again not to depend on the tone pattern of the place name in many cases; in fact, Abraham (1959) describes this construction as consisting of a ba- prefix and the tone pattern LHL (which I interpret as meaning $L(H)_1L$) for the masculine. These facts show, first of all, that the situation with the place of origin constructions is quite variable; neither Abraham's description nor Leben's accounts for all cases (Leben seems to imply that the masculine is formed by prefixing a L ba to the place name).

It should be pointed out that (7d) could only be accounted for (as far as I can tell) by having an 'abstract' rising tone on the ee of Nufee (cf. fn. 4); exactly the same problems as were encountered with the forms in (6) would obtain here.

However, one regularity remains--all feminine forms that end in surface -iyaa also end in the tone pattern HLH. This is also true of the forms accounted for by (5iii), although the antepenultimate H would be redundant in this case, since all the relevant stems end in H tones. This suggests that (5iii) might better be formulated as in (8), so as to include the place of the origin phenomena.

(8) The tone pattern...is BHLL.[6]

If the fact that forms like kàryáa (cf. fn. 2) are exceptional is not accidental (note that the stem ends in a L), then this would be evidence in favor of the reformulation given in (8).

2.4. In short, I have argued in this section that it is not necessary to represent Hausa tone suprasegmentally in Leben's sense.

In the next section, I will attempt to show that suprasegmental tone is not sufficient to account for other phenomena in Hausa, and that, in fact, a theory which permits the type of analysis proposed here is required.

3. Other similar phenomena

3.1. I will attempt to show here first of all that it is not possible to relate derivationally the tone patterns of certain classes of singular nouns and those of their plurals, regardless of whether tone is represented segmentally or suprasegmentally.[7] Consider the forms in (9).

(9)	a.	làabáarìi	(sg.)	làabàarái (pl.)	'news'
	b.	kúj̀èeráa	(sg.)	kùj̀èerúu (pl.)	'chair'
	c.	kàasúwáa	(sg.)	kàasùwài (pl-Skoto)	'market'

It seems clear that it would be at least very difficult to relate the singular and plural tone patterns derivationally. Evidently what is needed is a morphologically conditioned rule which assigns the tone pattern $(L)_1H$ to nouns which are lexically marked for this pattern in the plural.[8]

3.2. Secondly, there seems to be no way to relate intensive verb forms to their basic forms using ordinary tone rules. Consider the data presented in (10).

(10)	a.	káamàa	kánkàamáa	'catch'
	b.	hàrbáa	hàhhárbàa (__#)	'shoot'
		hàrbée	hàhhàrbée (__Pro)	
		hàrbí	hàhhàrbí (__N)	
	c.	fìtá	fìrfítà (one alternant)	'go out'

The intensives are formed by reduplicating the first CVC sequence, and then rules of assimilation apply to give the surface form. It should be fairly obvious that ordinary segmental tone rules can at best clumsily relate the forms in (10a) and (10c) and the pre-pausal form is (10b). Furthermore, suprasegmental representation, if made a part of the lexical representation (i.e., if tone is represented as a part of morphemes), implies wrong results, in (10b) and (10c), although interestingly (but, I think, accidentally), it does predict the correct forms in (10a). There seem to be three possibilities: first, the tone mapping rules apply before reduplication, which reduces to the same case as for segmentally represented tone; second, the suprasegmental contour is reduplicated along with the appropriate segments; third, the suprasegmental contour remains the same but has as its domain the entire reduplicated form. The latter two possibilities are illustrated in the derivations given in (11) and (12), respectively.

(11) HL_{kaamaa} Lexical Representation
$HL_{kam+HL}kaamaa$ Reduplication
*kânkáamàa Tone Mapping

(12) a. HL_{kaamaa} Lexical Representation
$HL_{kankaamaa}$ Reduplication
kánkàamàa Tone Mapping
kànkàaméa (correct) L-raising

b. (__#) (__Pro) (__N)
$\underline{LH}_{harbaa}$ $\underline{LH}_{harbee}$ $\underline{LH}_{harbi}$ Lexical Representation[9]
$LH_{hahharbaa}$ $LH_{hahharbee}$ $LH_{hahharbi}$ Reduplication
*hàhhárbáa *hàhhárbée *hàhhárbí Tone Mapping

c. LH_{fita} Lexical Representation
$LH_{firfita}$ Reduplication
*fìrfítá Tone Mapping

(I give only the derivation for (10a) in (11), since the other forms have exactly analogous problems.)

What seems to be the correct relationship between the tone patterns of the basic and reduplicated forms can be ascertained from a look at the Hausa 'verbal grade' system, as first proposed by Parsons (1960). There are a number of 'grades' of polysyllabic verbs in Hausa, which can be characterized by their tone patterns and final vowels. Thus káamàa is Grade 1, hàrbáa is Grade 2, etc. The interesting thing is that the tone patterns of the reduplicated forms are the same as those of other verbs in the same grade. This suggests that the tone patterns should be assigned after reduplication on the basis of the grade to which the verb in question belongs. Thus the rule assigning tone to regular verbs in Hausa would be something like (13).

(13) Assign Grade N tone patterns to Grade N verbs.

4. Conclusion

It seems clear then, that in order to account for these phenomena in Hausa, linguistic theory must allow tone not only to 'get out of step' with segments, as the proposals of Leben and Goldsmith would allow, but even to have no particular relationship to morphemes at all. That is, the tone-bearing unit in at least areas of a grammar of Hausa is the 'construction'--agentive (m.), agentive (f.), plural, Grade N verbs etc.

I will not attempt to formalize the rules proposed here; the formalisms proposed by both Leben and Goldsmith would seem to be fairly readily adaptable for such purposes. The important point is that (non-segmental) tone must be represented as a property not of morphemes (in the cases discussed here), but of entire constructions. For this to be possible, either tone must not be represented in the lexicon and is assigned by a rule which is sensitive to whether or not the morphemes in question are part of a construction which has a characteristic tone pattern, or the

formalisms involved must be capable of erasing (or ignoring) the tones that are already associated with morphemes. I will not pursue the subject of a formalism forther here, although I agree (contrary to some linguists) that such matters are quite important.

It is interesting to note that Courtenay's (1974) reanalysis of tone in Bambara noun compounds would appear to necessitate the same sort of loosened framework for tonology. Another example of phenomena which seem to be suitable for this type of treatment is the Mende noun compounds phenomena discussed by Leben and by Dwyer (1973). The related Southwestern Mande languages discussed by Dwyer are very similar to Mende, and would seem to be amenable to similar treatment.

Since Courtenay has argued convincingly that Leben's suprasegmental rule for Bambara is incorrect, and since similar problems will probably crop up in Maninka (which is a dialect of Bambara), then if the analysis I gave in section 2 is accepted, we are left with no known suprasegmental tone rules. This state of affairs would seem to be that predicted by Goldsmith's theory (subject to the reservations mentioned in fn. 5)--if tone rules apply only to tones 'associated' to vowels, then suprasegmental rules of the type proposed by Leben would not be permitted. Such a restriction on tone rules is clearly desirable, since it results in a stronger (i.e., more falsifiable) theory. This would then be another point in favor of the reanalysis presented here. Note that, since rules of the type proposed here are needed elsewhere (as Leben admits), the theory is not weakened any by proposing such a rule to account for the phenomena in question.

In summary, then, the suprasegmental framework proposed in Leben (1973a, b) is neither necessary nor sufficient to account for the range of phenomena known to occur. On the other hand, one similar to that proposed in Goldsmith (1975a, b) (restricted so that all tone rules apply after the well-formedness condition, and augmented to allow for the type of rule discussed here) seems to be both necessary and sufficient to handle these phenomena.

Footnotes

*This paper has benefited from discussions with Dave Dwyer, John Eulenberg, John Goldsmith, and Will Leben. The latter deserves an extra vote of thanks, since without his previous work both on Hausa and on tone in general, I would not have been led to ask the questions which have resulted in this paper.

[1]By 'suprasegmentally stated rule' (or simply 'suprasegmental rule') I am referring to a rule which makes crucial reference to tones which are represented suprasegmentally in Leben's sense, i.e., tones which are represented on entire morphemes and have not yet been 'mapped' onto segments. Thus the rules discussed in Goldsmith (1975b) do not qualify in this technical sense as 'suprasegmental rules'. Unless this paper is viewed with this definition in mind, the point of view implied by the title (i.e.,

that there are no suprasegmental rules in Hausa) might seem self-contradictory, since I hope to show that at least some tone is (to use a neutral term) non-segmental. The question asked in the title could be rephrased as "what kind of non-segmental tone does Hausa have?"

[2]The forms given are actually rather remote representations. A number of other rules will apply to these forms to produce the correct surface forms (cf. Leben 1971 for a discussion of these rules).

[3]This analysis would require considering pairs such as Kàrée/Kàryáa (= 'dog') as exceptional, as indeed they seem to be. I would consider such pairs as yáròo/yáarínyàa (= 'boy'/'girl') and záakìi/záakányàa (= 'lion') as exceptions, with the feminine and masculine suffixes represented separately in the lexicon. This is contrary to Leben (1971), who attempts to relate them, although not very successfully, it seems to me.

[4]I find Leben's (1971) arguments that the genitive linker has an underlying rising tone unconvincing; one important claim in Leben's anlaysis--that there is independent evidence for a H on the first person possessive pronoun--seems to be incorrect in view of the discussion in Eulenberg (1973). See the above-mentioned articles for further discussion. Leben pointed out in the question period following this paper that a theory such as that proposed by Goldsmith (much of which Leben now accepts in preference to his own original proposals) would allow such forms to be generated without absolute neutralization rules. Strictly speaking, this may be true (I'm not sure what an 'autosegmental' analysis would look like), but it would seem that any proposal which attempts to relate derivationally the tone patterns in the masculine and feminine for such forms would in spirit require absolute neutralization: presumably at some stage of the derivation, there would be a rising tone on the final vowel in the masculine which would have to be simplified by rule.

[5]Another comment by Leben after this paper was that his analysis would allow morphemes to have only one type of tone (i.e., there could be no mixtures of H and L within a morpheme in the relevant constructions), while my analysis would not imply these facts. Strictly speaking, this is true; however, the necessary tone patterns in the rule corresponding to (5) would have to be quite complex if these facts did not obtain. It is possible that there is a limit to the permissable complexity of tone patterns (or at least, more complex patterns are highly marked), although I haven't investigated this possibility in any detail. Note that the tone patterns proposed here seem fairly simple intuitively.

It should also be pointed out that Goldsmith's theory (which, as noted above, Leben views quite favorably) would have as much trouble simply stating the generalization that Leben claims is involved as would a theory in which tone is represented segmentally, unless there are tone rules which apply before the tones are 'associated' with segments. Goldsmith makes no specific allowance for such rules (all the rules discussed by Goldsmith apply after this association), and they would have to be of a different formal nature than those Goldsmith discusses.

[6]There is a problem with this formulation in that the H must replace a L of the basic stem pattern (which I assume to be the same as the pattern for the masculine--there may be no direct relationship between the tone pattern on the stem in isolation, and what I am referring to as the 'basic stem pattern', as noted above) in the cases that are crucial to Leben's rule's being suprasegmental, such as (7a). It will be seen in the final section that the formalism required for these rules will probably have to be capable of replacing tones that are already on morphemes. However, all other rules replace either all of the tones of a morpheme or none of them. A rule which replaces only one of the tones of a morpheme could surely be made to work somehow (e.g., by a 'universal convention'), but I know of no really intuitively satisfying way of doing this.

A further revision might be indicated by the feminine form given in (7e). Notice first that if the normal process of forming the feminine is carried out, the entire basic tone pattern would be obliterated. Thus a restriction might be added to (8) which would disallow the normal process in such cases and force another type of feminine-formation (namely changing the final vowel to a). Such a revision would create a (look-ahead) global rule (cf. Hill 1970, Lightner 1971), which would be rejected by many generative phonologists. However, since Leben's formulation doesn't account for such forms at all, this point is not critical for choosing between the two analyses.

[7]John Eulenberg has pointed out to me that such a derivational relation may be possible if (excessively, in my view) abstract underlying representations are used. This is probably the case, since as Derwing (1973) points out, a theory with essentially no restrictions on underlying forms allows tremendous leeway in linguistic descriptions. I suspect that such representations (if they "exist") could be shown to imply incorrect predictions about new forms using methods such as those demonstrated in Churma (1974).

[8]I assume that each noun is lexically marked for its plural, since the Hausa plural system is so variable. There probably are ways of predicting subregularities in plurals, but since this issue is not crucial to this discussion, I won't pursue it further here.

[9]It is not at all clear exactly what the lexical representation should be in cases like this, given the strange morphologically conditioned variation in vowel quality. However, it seems fairly clear that the underlying tone contour for the basic forms should be LH; in any case, no tone contour could give the correct results in such cases, as far as I can tell. This phenomenon clearly has important implications for almost any theory of phonology, but I cannot examine it here, due to space limitations.

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